# 811 PAINTS, COATINGS AND PRESERVATIVES

## 811.01 GENERAL

The Contractor shall make arrangements with the Engineer for sampling and testing all paint sufficiently in advance of proposed use to insure its conformance to specification requirements. No paint shall be shipped to the project site before it has been tested and approved.

Samples shall be identified as to material designation, batch number, manufacturer's order number, date of manufacture, date of sampling, and project name and number.

At the option of the Engineer, plant inspection may be required at any time.

All paint furnished must be shipped in strong, substantial, properly sealed containers, plainly marked with the job number, name, weight, and volume of the paint together with the color, formula, name and address of manufacturer, date of manufacture, batch number, date of shipment, and special mixing instructions, if any.

Irrespective of inspection and tests during manufacture, the finished products as actually delivered must comply in all details with the specification requirements.

After delivery, the paint shall at all times be subject to field sampling and testing. The unit weight (minimum net weight per gallon) and color shall constitute minimum field acceptance requirements. At the option of the Engineer, additional one quart samples may be sent to the laboratory for testing.

All rejected paint shall be so marked and immediately removed from the work area to the satisfaction of the Engineer.

Raw materials, unless otherwise specified in the paint and coating formulas, shall conform to requirements of the specifications indicated in Table 811.02. Requirements of specifications required for particular use shall govern in the event of conflict.

**[Section 811 should be revised in its entirety]**

## 811.02 RAW MATERIALS

### TABLE 811.02

| Raw Material | Specification |
|---|---|
| Alkyd Resin | FS TT-R-266, Type I, Class A or B |
| Aluminum Pigment, Paste | FS TT-T-291, Type II, Class 2 |
| Aluminum Stearate | Military MIL-A-15206A |
| Basic Lead Silico Chromate | ASTM D1648 |
| Basic Zinc Chromate Butyral | MS MIL-C-153-28A |
| Carbon Black | FS TT-P-343, Form I, Class A |
| Chromium Oxide, Green | FS TT-P-381, Color 4D |
| Lampblack (paste in oil) | FS TT-P-381, Color 1D |
| Linseed Oil Heat-Polymerized | FS TT-L-201, Type II, Viscosity 2-2 |
| Linseed Oil, Raw | ASTM D 234 |
| Magnesium Silicate | ASTM D 605 |
| Mica (325 mesh) | ASTM D 607 |
| Organo Monomorillonite | An organic ammonium compound of monomorillonite. It shall be a fine, creamy white powder, with high gelling efficiency in a wide range of organic liquids, with water content of less than 30 and fineness of less than 5 retained on the No. 200 sieve. |
| Phosphate Pretreatment | MS MIL-C-10578 |
| Red Iron Oxide | Siliceous, 85 Fe{O} min. |
| Tallow | FS C-T-91 |
| Titanium Dioxide | ASTM D 476, Type I or III |
| Thinner, Mineral Spirits | FS TT-T-291, Type II, Grade A |
| Turpentine, Gum Spirits and Wood | FS TT-T-801, Type I or II |
| Varnish, Spar, Water Resisting | FS TT-V-121 |
| Zinc Dust | FS TT-P-460, Type I |
| Zinc Oxide | FS TT-P-463, Type I |

## 811.03 PRIME COAT

**(A) BASIC LEAD SILICO CHROMATE.** Factory- mixed basic lead silico chromate paint shall conform to the requirements of AASHTO M 229, Type V. This paint shall be used for spot painting on existing steel and intermediate coat on new and existing steel. On areas to receive two coats of this paint, the first coat shall be darkened with 1/4 ounce of lampblack paste per gallon of paint to provide a contrast between shades of the two coats, subject to approval by the Engineer.

**(B) ZINC DUST-ZINC OXIDE PRIMER PAINT.** Zinc dust-zinc oxide primer paint shall conform to the requirements of the Federal Specification TT-P-641G, Type I. This paint shall be used for priming galvanized metal prior to field painting with finish coats. Minimum net weight of the finished paint shall be 23 pounds per gallon.

**(C) PETROLATUM PRIMER.** Rust-inhibitive petrolatum primer shall conform to the

requirements of the U.S. Maritime Administration Specification 52-MA-602, Type B Medium. This primer shall be used for coating field metal to metal contact surfaces, field weld areas, or other metal surfaces where a temporary rust-inhibitive coating is required. This primer may be removed by wiping with thinner (mineral spirits) conforming to requirements of 811.02.

**(D) WOOD PRIMER-SEALER.** Wood primer-sealer shall conform to requirements of the Federal Specification TT-P-25E. This primer-sealer shall be used for priming new wood surfaces and weathered, previously painted wood surfaces prior to field painting with finish coats.

**(E) ZINC-CHROMATE, LOW-MOISTURE SENSITIVITY.** Factory-mixed zinc-chromate low moisture sensitivity primer shall conform to the requirements of FS TT-P-1757, Composition L. This paint shall be used to coat surfaces of aluminum parts that will be embedded in concrete or masonry.

**(F) PRIMER FOR COATING ELECTRICAL WORK.**

**(1) SHOP COAT.** Shop coat primer for coating electrical work shall conform to FS TT-P-645.

**(2) FIELD COAT.** Exposed conduits, supports and other galvanized fittings of Sec. 622, or exposed parts thereof shall be field painted with one coat of zinc oxide galvanized primer paint meeting the requirements of FS TT-P-641 B, Type II.

**(G) INORGANIC ZINC RICH PRIMER.** Self-curing inorganic zinc-rich primers covered by this specification shall be two component solvent base vehicle type.

**(1) MATERIAL REQUIREMENTS.** The pigment used in the formulation shall be basically zinc dust. Small amounts of color and extender pigments may be used provided the quantitative requirements of the complete paints are met.

Zinc dust shall be per ASTM D520, Type I, modified to allow 0.1 percent retained on the number 100 mesh screen.

Vehicle shall be a solvent solution with silicates, curing aids, tinting colors, suspension and pot life control agents of the manufacturer's choosing.

The color of the inorganic zinc primer shall be such that a definite contrast is readily apparent between it and the color of blasted steel.

The pot life of the mixed paint shall be a minimum of 8 hours at 77 F and 50 percent humidity.

The vehicle of the paint shall show no thickening, curdling, gelling, gassing, or hard caking after being stored unmixed for 9 months from date of manufacture in a tightly covered unopened container at a temperature of 50 to 90 F. Storage life shall be in accordance with ASTM D 1849.

**(2) DRYING TIME.** Set to touch time of mixed paint shall be determined in accordance with ASTM-D 1640 and shall be no more than 30 minutes at 77 F.

Cure hard to recoat time of mixed paint shall be determined by the methyl ethylketone (MEK) rub test. Using a wadded piece of cheesecloth saturated with methyl ethyl ketone, rub back and forth with firm pressure over a one inch long section of the primer 50 times. Examine the surface of the primer. It shall

show only burnishing, polishing, or trace removal of loose surface particles when the primer has been cured for 24 hours at 80 F and 90 percent relative humidity.

**(3) OTHER COATS.** The intermediate coat, if specified, shall be from the same paint supplier as the prime coat and shall be compatible with the primer and the topcoat.

The topcoat, if specified, shall be from the same paint supplier and shall be compatible with the primer and intermediate coat.

The Contractor shall conduct tests to determine intercoat compatibility of approved primer, intermediate and topcoats to be used. Tests shall be conducted on areas of the structure as directed by the Engineer.

## 811.04 INTERMEDIATE COAT

**(A) ALKYD RESIN PAINT.** Alkyd resin paint used as an intermediate coat shall conform to the following:

| **Composition:** | **Percent by Weight** | |
|---|---|---|
| | **Min.** | **Max.** |
| Pigment | 62.0 | |
| Basic lead silico chromate | 67.0 | |
| Titanium dioxide, rutile non-chalking | 15.0 | |
| Zinc oxide, acicular | 5.0 | |
| Magnesium silicate | 12.7 | |
| Phthalocyanine blue | trace | |
| Organo montmorillonite | 0.3 | 0.7 |
| Vehicle | 38.0 | |
| Non-volatile vehicle | 68.0 | |
| Raw linseed oil | 45.0 | |
| Alkyd resin solids | 22.5 | |
| Mineral spirits, driers and anti-skinning agent | 32.0 | |
| Phthalic anhydride, by weight of non-volatile vehicle | 7.7 | |

Driers - Sufficient quantities of driers shall be used to ensure satisfactory drying within the specified time for the paint.

Grinding aids, wetting agents and anti-skinning agents may be used in appropriate quantities as required.

The vehicle shall be free of rosin and rosin derivatives.

| **Physical Requirements:** | **Min.** | **Max.** |
|---|---|---|
| Weight per gallon-Pounds | 14.4 | |
| Fineness of grind | 4.0 | |
| Viscosity-K.U. | 75.0 | 84.0 |
| Drying time, hours | 24.0 | |

Set to touch, hours ..... ..... ..... ..... ..... ..... ..... 6.0

Skinning: Paint shall not skin when allowed to stand 48 hours in tightly closed three-quarters filled container.

Appearance: The paint shall dry to a smooth semi-gloss finish and free from roughness, grit, unevenness, and other surface imperfections.

**(B) BASIC LEAD SILICO CHROMATE.** See 811.03(A).

## 811.05 TOPCOAT

**(A) ALUMINUM TOPCOAT.** Aluminum paint used as a topcoat shall be a two-component aluminum leafing paint composed of 1-1/2 pounds of aluminum pigment paste for each gallon of aluminum mixing varnish.

This aluminum mixing varnish shall be a long oil varnish and shall contain not less than 50 percent, by weight, of non volatile oil and gums. The varnish shall be free from sulphur, sulphur compounds and rosin. The acid number of the varnish shall be not more than 10, based on the nonvolatile content.

The varnish shall pass a 100 percent Kauri reduction test.

The viscosity of the varnish shall be from A to D inclusive, as determined with Gardner Bubble Viscometer, Varnish Series.

The varnish, when mixed with paste, shall produce a paint showing satisfactory leafing and spreading properties, and shall not run nor sag when applied to a smooth vertical surface.

The paint shall set to touch in not less than 2 hours nor more than 6 hours, and shall dry hard and tough in not more than 24 hours.

The aluminum paste and varnish shall be furnished in separate containers unless otherwise permitted by the Engineer. The container for the varnish shall be of such size as will permit the mixing of the paste and varnish in the proper proportion without overflow.

Leafing paint shall be mixed immediately prior to application, in the presence of the Engineer and shall be used within 24 hours after mixing.

Leafing and non-leafing paint shall not be mixed together, and paints so blended will be rejected.

The paste shall conform to Federal Specification TT-P-320, Type II, Class 2, except the paste shall be non-leafing.

**(B) ALKYD RESIN TOPCOAT.** Materials not specified herein shall be selected by the Contractor; however, the finished product shall conform to all the requirements herein.

| Composition: | Percent by Weight | |
|---|---|---|
| | Min. | Max. |

Pigment

| | |
|---|---|
| Basic Lead Silico Chromate | 99.2 |
| Organo-montmorillonite | 0.8 |
| Tinting Compounds | |

Vehicle

| | |
|---|---|
| Non-volatile vehicle | 60.0 |
| Alkyd resin solids | 40.0 |
| Raw Linseed Oil | 19.0 |
| Mineral Spirits, driers, and anti-skinning agents | 24.0 |

Driers - Sufficient quantities of driers shall be used to ensure satisfactory drying within the specified time for the paint.

Grinding aids, wetting agents, and anti-skinning agents may be used in appropriate quantities as required.

Tinting compounds, which are substituted for basic lead silico chromate, shall be composed of all prime pigments. Hiding pigments shall be chemically pure, free from extenders, color permanent and nonreactive. If titanium dioxide is used, it shall conform to ASTM D 476, Type IV. Small amounts of other tinting compounds may be used in order to match the desired shade.

| **Physical Requirements:** | **Min.** | **Max.** |
|---|---|---|
| Weight per gallon (pounds) | 10.5 | |
| Viscosity, K.U. | 62.5 | 75 |
| Drying time (hours) | | 24 |
| Set to Touch | | 6 |

**(C) LIGHT-GRAY PAINT.** Factory mixed light-gray paint shall conform to the requirements of FS TT-E-489G, Type I, Class A for brush application, or Class B for spray application (if gloss is not desired, paint shall conform to the requirements of FS TT-P-105), and shall be tinted with lamp black paste to match Paint Chip No. 26408 of FS No. 595, "Colors." On areas to receive two coats of this paint, the first coat shall be darkened with additional lampblack paste in sufficient amount to provide a contrast between shades of the two coats, subject to approval by the Engineer.

**(D) WHITE PAINT.** Factory mixed white paint shall conform to the requirements of FS TT-E-489G, Type I, Class A for brush application, or Class B for spray application (if gloss is not desired, paint shall conform to the requirements of FS TT-P-105). On areas to receive two coats of this paint, the first coat shall be darkened with lampblack paste with the minimum amount of lampblack added.

**(E) BLACK PAINT.** Factory mixed black paint shall conform to the requirements of FS TT-E-489G, Type I, Class A for brush application, or Class B for spray application (if gloss is not desired, the paint shall conform to the requirements of FS TT-P-105).

**(F) ASPHALT VARNISH PAINT.** Factory-mixed asphalt varnish paint shall conform to requirements of FS TT- V-51, for "Varnish, Asphalt". This paint shall be used to thoroughly coat surfaces of aluminum parts that will come in contact with concrete or masonry surfaces, but excluding aluminum

parts embedded in concrete or masonry.

**(G) GRAY CHANNEL PAINT.** Paint to coat light standard installations after they are erected; all exposed shop painted surfaces shall be field painted with one coat of gray channel paint meeting the requirements of FS TT-E-489C and matching the gray paint color used by PEPCO.

## 811.06 SOLVENTS

Solvents used for solvent cleaning of metal surfaces shall include kerosene, naphtha, and mineral spirits. Substances not removable by these solvents shall be removed by methods and chemicals presented in Chapter 2.9 of Steel Structures Painting Council (SSPC) "Good Painting Practice," Volume I.

Solvents shall be approved by the Engineer before use.

## 811.07 GALVANIZING

Galvanizing shall refer to the coating of steel or iron parts with metallic zinc by the hot dip process.

All metal parts to be galvanized shall be thoroughly cleaned before application of zinc, and for steel and iron castings this cleaning shall include sandblasting. Hot-dip galvanizing of metal shall conform to the requirements of AASHTO M 111.

Galvanizing of iron and steel hardware, unless otherwise specified, shall conform to AASHTO M 232.

## 811.08 ALUMINUM COATINGS

**(A) GENERAL.** When indicated on the plans, anchor bolts, washers, nuts or other hardware shall be given an aluminum coating, applied by hot dip process, conforming with the requirements noted herein.

**(B) MATERIAL AND MANUFACTURE.** The aluminum used for the coating shall be 99.0 percent minimum aluminum content corresponding to Grade No. 1100 as designated by the Aluminum Association.

The aluminum coating on threads, except on tapped threads, shall not be subjected to a cutting, rolling or finishing tool operation, unless specifically authorized by the Engineer.

**(C) THICKNESS OF ALUMINUM COATING.** The thickness of coating shall not be less than 0.002 inch on any individual specimen and the average of the specimens tested shall be not less than 0.0023 inch.

**(D) UNIFORMITY AND ADHERENCE OF ALUMINUM COATING.** The coating shall be continuous and reasonably uniform in thickness. The coating shall adhere tenaciously to the surface of the base metal. When the coating is cut or pried into, such as with a stout knife applied with considerable pressure in a manner tending to remove a portion of the coating, it shall only be possible to remove small particles of the coating by paring or whittling, and it shall not be possible to peel any portion of the coating so as to expose the steel.

**(E) WORKMANSHIP AND FINISH.** The aluminum coated articles shall be free from uncoated spots and other defects.

## 811.09 WOOD PRESERVATIVES

**(A) FOR PARK TYPE WOODEN GUIDERAIL.** Pressure treatment shall be with pentachlorophenol petroleum solution in accordance with AWPA C14, with a minimum net retention of 0.4 pound per cubic foot. The pentachlorophenol solution shall have a minimum of 5 percent pentachlorophenol, meeting the requirements of AASHTO M 133 (AWPA-P8), in an oil-base vehicle, meeting the requirements of AASHTO M 133, and as nearly colorless as obtainable.

**(B) CREOSOTE FOR TIMBER PILES.** Creosote for use on timber piles shall conform to AASHTO M 133.

**(C) CHROMATED ZINC CHLORIDE FOR GROUND MOUNT SIGN POSTS.** Preservative shall be chromated zinc chloride conforming to AASHTO M 133 and there shall be a final retention of not less than 1.15 pounds of dry salt per cubic foot of wood.